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REMARKS

Restriction Requirement

Restriction has been required between three groups of claims: Group I, Claims 1-5 and 15-19; Group II, Claims 6-14; and Group III, Claims 20 and 21. Applicants affirm, with traverse, the provisional election of Group I, claims 1-5 and 15-19.

Although Applicants do not dispute the restriction of Group III, claims 20 and 21, they believe that the restriction of Groups I and II is improper. Groups I and II are related as product made and process of making, respectively. According to the Manual of Patent Examining Procedure,

> A process of making and a product made by the process can be shown to be distinct inventions if either or both of the following can be shown: (A) that the process *as claimed* is not an obvious process of making the product and the process *as claimed* can be used to make other and different products; or (B) that the product *as claimed* can be made by another and materially different process.

MPEP 806.05(f) (emphasis in original). Applicants respectfully assert that neither criterion (A) nor criterion (B) is satisfied here. Criterion (A) is not satisfied because the process as claimed is an obvious process of making the product. Criterion (B) is not satisfied because the product as claimed cannot be made by a materially different process. If the Examiner believes that the product as claimed can be made by a materially different process, the Examiner bears the burden of documenting a viable alternative process. Id.

Accordingly, it is respectfully requested that the requirement for restriction be reconsidered and withdrawn.

Support for Claim Amendments

In claim 1, support for the definition of "n" as "1 to about 23,000" is supported by claim 3 as filed and the first full paragraph of page 5.

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In claim 3, support for the values of "n" may be found in the corresponding molecular weight values of 1,000 and 10,000 in the page 4 reaction scheme. In particular, the values of "n" were obtained by dividing the polyethylene glycol molecular weight values by 44.05 grams per mole for the ethylene oxide repeating unit.

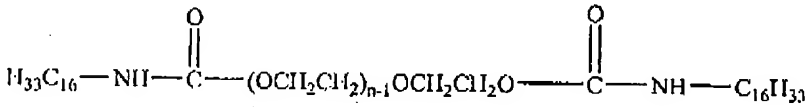
Amendment of Inventorship

Applicants are submitting herewith a letter pursuant to 37 C.F.R. §1.48(b) to amend the inventorship by deleting inventors Qing Ge and Chandeng Liu, who are inventors only of the subject matter of canceled claims 20 and 21.

Claim Rejection Under 35 U.S.C. § 103(a)

Claims 1-5 and 15-19 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over O. Vorobyova et al., *Macromolecules*, vol. 31, pages 8998-9007 (1998) (hereinafter "Vorobyova") in view of B. X. Fu and B. S. Hsiao et al., *Polymer*, vol. 42, pages 599-611 (2001) (hereinafter "Hsiao"). Applicants respectfully traverse this rejection.

Vorobyova generally describes fluorescent probe studies of poly(ethylene oxide) modified with hexadecyl isocyanate to form hydrophobically-modified poly(ethylene oxide) having the structure



where n is 800. The fluorescent probe studies were used to study the association of the hydrophobically-modified poly(ethylene oxide) in aqueous solution. Vorobyova pp. 8998-8999. Aggregation of the hydrophobically-modified poly(ethylene oxide) in aqueous solution was observed, but no practical uses for this aggregation were discussed.

In Hsiao, the authors (including present inventor Patrick T. Mather) generally describe x-ray diffraction, x-ray scattering, and transmission electron microscopy studies of a polyurethane elastomer with POSS units distributed uniformly along the backbone of

the polymer, not specifically at the chain ends. *See, e.g.*, Hsiao, page 600, Figure 1. Applicants therefore respectfully assert that the Examiner has mischaracterized Hsiao by stating that it "disclose[s] that end-capped with POSS 'such organic-inorganic hybrid polymers possess improved properties such as higher T_g, increased oxygen permeability, reduced flammability and enhanced mechanical strength.'" 5/21/04 Office Action, page 5, last paragraph (emphasis added). Hsiao does not include any description of telechelic (end-capped) polymer architectures.

Applicants' claim 1 structure and claim 6 method (from which rejected composition claims 15 and 16 ultimately depend) each require (a) the combination of hydrophobic POSS with a hydrophilic polymer (polyethylene oxide), and (b) a telechelic (i.e., both ends capped) architecture where the hydrophobic POSS is at each end of the polyethylene oxide chain.

Applicants respectfully assert that their independent claims 1 and 6 are patentable over Vorobyova in view of Hsiao because (1) there is no motivation to combine the cited references, (2) modifying Vorobyova according to Hsiao would destroy the function of Vorobyova's polymers, (3) the cited references provide no suggestion of Applicants' claim 1 and claim 6 inventions, and (4) the cited references provide no expectation of success for Applicants' compositions.

First, claims 1 and 6 are patentable over Vorobyova in view of Hsiao because there is no motivation for one of ordinary skill in the art to combine the references. Vorobyova teaches a polyethylene oxide hydrophobically-modified with a hexadecyl group at each end of the molecule. This molecular architecture allows the formation of micelles in aqueous solution, with the central polyethylene oxide segment forming a hydrophilic shell and the end hexadecyl groups forming a hydrophobic core which hosts the hydrophobic probes used in Vorobyova's fluorescence studies. Vorobyova, p. 9000. Hsiao describes polyurethane elastomers with POSS units distributed uniformly along the backbone of the polymer, not at the ends of the polymer as the Examiner asserts. Given the completely different molecular architectures of the Vorobyova and Hsiao polymers, one of ordinary skill in the art would have no motivation to combine these references.

For this reason the combination of Vorobyova and Hsiao does not support a prima facie case of obviousness against Applicants' claims 1 and 6.

Second, combining Vorobyova and Hsiao is further discouraged by the fact that modifying Vorobyova according to Hsiao would destroy the function of Vorobyova's polymers. As noted above, a key function of Vorobyova's polymers is to form micelles in aqueous solution, the micelles having hydrophilic polyethylene oxide shells and hydrophobic hexadecyl cores. If one of ordinary skill in the art ignored the different molecular architectures of the Vorobyova and Hsiao polymers and modified Vorobyova according to Hsiao, one would somehow attempt to decorate the Vorobyova polymer with POSS groups along the backbone of the chain. Leaving aside the problem that there is no obvious chemical route to incorporating POSS groups along the backbone of the Vorobyova polymer chain, the resulting chain would having hydrophobic end groups and hydrophobic groups along the backbone of the chain. It would therefore be insoluble in water, would fail to form micelles, and would be unsuitable for the fluorescence studies of Vorobyova. Thus, modifying Vorobyova according to Hsiao would destroy the function of Vorobyova's polymers.

Third, the cited references provide no suggestion of Applicants' claim 1 composition or claim 6 method. As noted above, if one were to modify Vorobyova's polymer according to Hsiao, one would obtain a chain with POSS groups along the backbone of the chain. In contrast, Applicants' claim 1 composition and claim 6 method provide POSS groups only at the ends of a polymer chain. Therefore, the modification of Vorobyova according to Hsiao does not suggest Applicants' claim 1 composition or claim 6 method.

Fourth, the cited references provide no expectation of success for Applicants' claim 1 composition or claim 6 method. As noted above, Vorobyova's compounds were used to study their own aggregation in aqueous solution. Vorobyova discloses no actual utility for the compounds besides their use in these academic studies. Similarly, Hsiao states that his "goal in this study is to understand the effect of POSS molecules on both microscopic and macroscopic properties." Thus, neither Vorobyova nor Hsiao discloses

a utility for their respective polymers. The combined references therefore fail to disclose any particular utility, let alone the specific utilities disclosed for Applicants' claim 1 polymers or polymers produced by the claim 6 method, such as "adjustment of viscosity for purposes of processing, for example in coating applications, or in the formulation of products such as shampoo, facial cream, toothpaste and the like" (p. 2, top paragraph), "conversion to ceramic (SiO_2/SiC) nanostructures" (p. 3, top paragraph), and "solid polymer electrolytes for ion-conducting batteries" (p. 3, top paragraph). The combination of Vorobyova and Hsiao thus fails to provide an expectation of success for Applicants' claim 1 composition and claim 6 method.

For all of the above reasons, the combination of Vorobyova and Hsiao does not support a prima facie case of obviousness against Applicants' claim 1 or claim 6, and claims 1 and 6 are therefore patentable under 35 U.S.C. §103(a) over Vorobyova in view of Hsiao. Since claims 2-5 and 17-19 each depend ultimately from and further limit claim 1, and since claims 15 and 16 depend ultimately from and further limit claim 6, claims 2-5 and 15-19 are also patentable over Vorobyova in view of Hsiao. Applicants respectfully request the reconsideration and withdrawal of the rejection of claims 1-5 and 15-19 under 35 U.S.C. §103(a) over Vorobyova in view of Hsiao.

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It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance is requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' Attorneys.

Respectfully submitted,

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